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9/26/01

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:
Brian FEENEY et al.

Serial No. 09/248,595 Group Art Unit: 3711

Filed: 2/11/1999 Examiner: M. Aryanpour

For: GAME BALL WITH IMPROVED MOISTURE RESISTANCE

Commissioner of Patents
Washington, D.C. 20231

ATTENTION: Board of Patent Appeals and Interferences

Honorable Sir:

APPEAL BRIEF

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This brief contains the following sections under the headings and in the order set forth below as required by (37 C.F.R. §1.192(c)):

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B. THE EXAMINER HAS THE BURDEN OF ESTABLISHING A *PRIMA FACIE* CASE OF OBVIOUSNESS WITHIN THE LEGAL REQUIREMENTS CREATED BY THE COURTS.

C. THE EXAMINER HAS FAILED TO ESTABLISH A *PRIMA FACIE* CASE OF OBVIOUSNESS AGAINST APPELLANTS' PENDING CLAIMS.

1. THERE IS NO SUGGESTION OR MOTIVATION, EITHER IN THE REFERENCES THEMSELVES OR IN THE KNOWLEDGE GENERALLY AVAILABLE TO ONE OF ORDINARY SKILL IN THE ART, TO COMBINE THE WALTERS AND FRIESE REFERENCES IN THE MANNER SUGGESTED BY THE EXAMINER.

   a. THE FRIESE REFERENCE DOES NOT TEACH OR SUGGEST PRODUCTION OF THE LEATHER PROPERTIES REQUIRED BY THE WALTERS REFERENCE.

   b. THE EXAMINER HAS FAILED TO PROVIDE A "CONVINCING LINE OF REASONING" AS TO WHY IT WOULD BE OBVIOUS TO COMBINE THE FRIESE AND WALTERS REFERENCES.

2. THE WALTERS AND FRIESE REFERENCES, SINGLY OR IN COMBINATION, DO NOT PROVIDE THE LEGALLY REQUIRED REASONABLE EXPECTATION OF SUCCESS REQUIRED TO ESTABLISH A *PRIMA FACIE* OBVIOUSNESS REJECTION.

3. EVEN IF THE WALTERS AND FRIESE REFERENCES ARE IMPROPERLY COMBINED, THE COMBINED REFERENCES DO NOT TEACH OR SUGGEST ALL OF THE FEATURES OF THE PENDING CLAIMS.

D. WHEN CONSIDERED AS A WHOLE THE WALTERS REFERENCE AND THE FRIESE REFERENCE TEACH AWAY FROM EACH OTHER.

E. THE WALTERS AND FRIESE REFERENCES, SINGLY OR IN COMBINATION, DO NOT TEACH OR SUGGEST ALL OF THE FEATURES OF PENDING CLAIM 5.

F. THE WALTERS AND FRIESE REFERENCES, SINGLY OR IN COMBINATION, DO NOT TEACH OR SUGGEST ALL OF THE FEATURES OF PENDING CLAIM 6.

G. **THE EXAMINER HAS RESORTED TO IMPERMISSIBLE HINDSIGHT TO ASSERT THAT APPELLANTS' CLAIMS ARE OBVIOUS OVER THE WALTERS AND FRIESE REFERENCES.**

H. **SINCE APPELLANTS' CLAIMS ARE NOT OBVIOUS IN VIEW OF THE CITED ART, THE EXAMINER'S REJECTION OF CLAIMS 1-6, 8-12 AND 17-18 MUST BE REVERSED.**

IX. APPENDIX OF CLAIMS INVOLVED IN THE APPEAL

The final page of section VIII bears the signature of Appellants' attorney.

I. REAL PARTY IN INTEREST (37 C.F.R. §1.192(c)(1))

This application was assigned to Spalding Sports Worldwide, Inc. a Delaware Corporation having a principal place of business at 425 Meadow Street, P.O. Box 901, Chicopee, MA. 01021-0901. The assignment was recorded on 7/6/1999 starting at reel 010067, frame 0927.

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. §1.192(c)(2))

There are no known appeals or interferences related to this application.

III. STATUS OF CLAIMS (37 C.F.R. §1.192(c)(3))

a. TOTAL NUMBER OF CLAIMS IN THIS APPLICATION

CLAIMS IN THIS APPLICATION NUMBER: 13

b. STATUS OF ALL CLAIMS

CLAIMS 1-6, 8-12, 17 and 18 ARE PENDING.

CLAIMS 1-6, 8-12, 17 and 18 ARE REJECTED.

c. CLAIMS ON APPEAL

THE CLAIMS ON APPEAL ARE CLAIMS 1-6, 8-12, 17 and 18.

IV. STATUS OF AMENDMENT (37 C.F.R. §1.192(c)(4))

On February 16, 2001 Appellants submitted an amendment. The amendment modified only claim 1 to correct an informality in the claim and is believed to have been entered.

V. SUMMARY OF THE INVENTION (37 C.F.R. §1.192(c)(5))

Briefly stated, one aspect of Appellants' invention comprises a game ball 10 having lower moisture absorption as compared to traditional leather covered game balls and some moisture resistant game balls. The lower moisture absorption properties of Appellants' game ball 10 are the result of the game ball cover comprising a natural leather that has been tanned with chemicals to impart moisture resistance properties substantially throughout the entirety of the fibers of the leather. The tanning and resultant moisture resistant properties of the leather are imparted prior to assembly of the game ball 10 and preferably prior to formation of the game ball cover 16 from the natural leather sheet. Appellants' invention advantageously does not require treatment after assembly of the game ball 10 to achieve improved moisture resistant properties. The cover 16 overlies an air bladder 12. The air bladder 12 is commonly made of a highly durable, stretchable inflatable material such as butyl rubber or a polyurethane material.

The lowered moisture absorption of Appellants' game ball may be further improved by use of an inventive moisture resistant lining 14 disposed intermediate the cover 16 and the bladder 12. The moisture resistant lining 14 may be used in

conjunction with a cover 16 comprising the inventive leather or with a cover comprising traditional leather having lesser moisture resistant properties.

VI. ISSUES (37 C.F.R. §1.192(c)(6))

(1) Whether claims 1-6, 8-12, 17 and 18 are patentable under 35 U.S.C. §103(a) over United States Patent No. 4,755,187 to Friese et al in view of U.S. Patent No. 5,069,935 to Walters.

VII. GROUPING OF CLAIMS (37 C.F.R. §1.192(c)(7))

Claim 1 stands alone.

Claims 2-4 stand together.

Claim 5 stands alone.

Claim 6 stands alone.

Claim 8 stands alone.

Claims 9-11 stand together.

Claims 12 and 17-18 stand together.

VIII ARGUMENTS - REJECTIONS UNDER 35 U.S.C. §103(a) (37 C.F.R. §1.192 (c)(8)(iv))

A. THE EXAMINER HAS FAILED TO CORRECTLY CONSTRUE THE PENDING CLAIMS WITHIN THE REQUIREMENTS CREATED BY RELEVANT LEGAL PRECEDENT.

The United States Supreme Court in Graham v. John Deere, 148 USPQ 459 (1966) stated "Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined." The examination of differences between the prior art and the claimed invention involves construing the claims at issue and comparing them to the prior art. Panduit Corp. v. Dennison Mfg. Co., 1 USPQ2d 1593, 1597-11597 (Fed. Cir. 1987).

1. THE EXAMINER HAS NOT CONSIDERED THE ENTIRETY OF APPELLANTS' CLAIMS.

As stated in MPEP §2173.01:

> A fundamental principal contained in 35 U.S.C. 112, second paragraph is that applicants are their own lexicographers. They can define in the claims what they regard as their invention essentially in whatever terms they choose so long as the terms are not used in ways that are contrary to accepted meanings in the art. Applicant may use functional language, alternative expressions, negative limitations, or any style of expression or format of claim which makes clear the boundaries of the subject matter for which protection is sought. As noted by the court in In re Swinehart, 160 USPQ 226 (CCPA 1971), a claim may not be rejected solely because of the type of language used to define the subject matter for which protection is sought.

The MPEP at §2173.05(g) goes on to state: "A functional limitation is an attempt to define something by what it does, rather than by what it is (e.g., as evidenced by its

specific structure or specific ingredients). There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper. A functional limitation must be evaluated and considered . . ."

Examiner Aryanpour has consistently refused to evaluate the functional language of Appellants' claims. See, for example, the April 25, 2001 Office Action at page 3, lines 9 to page 5, line 14 (emphasis added):

> Regarding the recitation "wherein when said ball is subjected to three 90 minute cycles of a rain test, . . . such ration being a maximum of 1.25:1.", such is not given patentable weight because such is a "method of testing" the "end product" under various test conditions in order to determine its durability, i. e. 90 minutes cycles of a rain test, and it is considered to be functional language.
>
> Regarding claim 2, the recitation of "wherein, said ratio is a maximum of 1.15:1", no patentable weight has been given since the ratio is a result of subjecting the "product" to specific test procedures.
>
> . . .
>
> Regarding the recitation in claim 3, "wherein when said ball is subjected to six 45 minute cycles of a rain test, at the conclusion of said six rain test cycles being a maximum of 1.19:1. " no patentable weight has been give since it is a "method of testing" the "end product" " under various test conditions in order to determine its durability, i. e. 45 minute cycles of rain test, and it is considered to be functional language.
>
> Regarding claim 4, the recitation of "wherein, said ratio is a maximum of 1.10: l", no patentable weight has been given since the ratio is a result of subjecting the "product" to specific test procedures.
>
> Regarding the recitation in claim 8, "wherein when said ball is . . . maximum 90 g of water at the conclusion of said sixth rain test cycle." no patentable weight has been give since it is a "method of testing" the "end product" " under various test conditions in order to determine its durability, i.e. six 45 minute cycles of rain test, and it is considered to be functional language.
>
> Regarding claim 9, the recitation of "wherein, said ball will absorb ...maximum of 65 g . . . at the conclusion of said sixth rain test cycle.", no patentable weight has been given since the ratio is a result of subjecting the "product" to specific test procedures.
>
> Regarding claim 10, the recitation of "wherein, said ball will absorb . . . maximum per cycle water gain of 115 g water. . . test

cycle.", no patentable weight has been given since the ratio is a result of subjecting the "product" to specific test procedures. . . .

Regarding claim 12, the recitation of "wherein when. . . maximum of 1.25:1.", no patentable weight has been given since the ratio is a result of subjecting the "product" to specific test procedures.

Regarding claim 17, the recitation of "wherein when . . . maximum of 1.27:1 . . . Conclusion of said first rain test cycle.", no patentable weight has been given since the ratio is a result of subjecting the "product" to specific test procedures.

Regarding claim 18, the recitation of "wherein when . . . maximum of 110 g of water . . . fourth cycle of said rain test.", no patentable weight has been given since the ratio is a result of subjecting the "product" to specific test procedures.

As can be seen from the above, Examiner Aryanpour failed to construe and consider features in virtually all of Appellants' pending claims.

a. **THE EXAMINER HAS NOT PROVIDED A LEGALLY SUFFICIENT REASON FOR REFUSING TO CONSIDER THE ENTIRETY OF APPELLANTS' CLAIMS.**

Examiner Aryanpour supports the refusal to construe and consider the entirety of Appellants' claim language at page 6, lines 10-15 stating, emphasis in original: "[i]n response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., game ball is placed in a test chamber and an oscillating water spray is disposed over the game ball) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims."

In Renishaw PLC v. Marposs Societa' Per Azioni, 48 USPQ2d 1117, 1120 (Fed. Cir. 1998), the Federal Circuit discussing the relationship between the written description and the claims stated the familiar cannon of claim construction that one

may not read a limitation into a claim from the written description, but one may look to the written description to define a term already in a claim limitation. That Court went on to state:

> . . . these two rules share two underlying propositions. First, it is manifest that a claim must explicitly recite a term in need of definition before a definition may enter the claim from the written description. . . . The other clear point provided by these two cannons covers the situation in which a patent applicant has elected to be a lexicographer by providing an explicit definition in the specification for a claim term. In such a case, the definition selected by the patent applicant controls. . . . If the patentee provides such a clear definition, the two cannons require reference to the written description, because only there is the claim defined as it is used by the patentee.

See also Corning Glass Works v. Sumitomo Electric, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989): "[i]t is entirely proper to use the specification to interpret what the patentee meant by a word or phrase in the claim."; MPEP §2111.01: "the words of a claim must be given their 'plain meaning' unless they are defined in the specification."; and In re Zletz, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989): "[w]hen the applicant states the meaning that the claim terms are intended to have, the claims are examined with that meaning . . .".

Appellants' specification on page 10, line 23-25 states, "if a game ball of the present invention having a leather cover and a lining is subjected to the "rain test" (as described herein) . . ." Appellants' specification on page 12, line 18 states "The footballs were tested for water resistance using the "rain test". The test consists of..." Appellants' specification on page 12, line 19 to page 13, line 22 goes on to describe Appellants "rain test". There is no plain meaning for the term "rain test", either in common or technical references. Since the present Appellants have provided

an explicit definition for the term "rain test", that definition must be used in construing the claims. Examiner Aryanpour's refusal to properly construe the entirety of Appellants' claims is contrary to legal precedent.

Examiner Aryanpour also supports the refusal to construe and consider the entirety of Appellants claim language at page 6, lines 16 to page 7, line 4, stating: "[i]n response to applicants argument that by subjecting an existing leather to numerous cycles of "rain test" a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim." As discussed further below, the cited prior art, either individually or as combined by the Examiner, is incapable of achieving the moisture resistance features recited in Appellants' claims. Examiner Aryanpour's refusal to properly construe the entirety of Appellants' claims is contrary to legal precedent.

Examiner Aryanpour further supports the refusal to construe and consider the entirety of Appellants' claim language at page 7, lines 1-4, stating:" [i]n a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. . . . Applicant is claiming a process of making and testing in an apparatus type claim." Appellants' claim 1 recites in pertinent part: "A game ball . . . comprising". Claim 1, contrary to Examiner Aryanpour's assertions, is devoid of method steps. Likewise, claims 8 and 11 are directed to articles also, and not to a

method. Examiner Aryanpour's refusal to properly construe the entirety of Appellants' claims is contrary to legal precedent.

2. THE EXAMINER HAS FAILED TO CONSTRUE THE PREAMBLE OF THE PENDING CLAIMS WITHIN THE REQUIREMENTS CREATED BY RELEVANT LEGAL PRECEDENT

Pending claim 1 recites in one pertinent part; "A game ball . . ." The remaining pending claims likewise limit the invention therein to a game ball. The April 25, 2001 Office Action at page 3, lines 3-8 states: "Regarding the preamble recitation that the ball is a "game ball " no patentable weight is given to the term "game ball" because such is a functional term. The leather can be used on any product including a game ball."

It is well known that language in the preamble can limit the invention if that language gives "life and meaning" to the claim. See Kropa v. Robie, 88 USPQ 478 (C.C.P.A. 1951). Examiner Aryanpour's admission that the "leather can be used on any product including a game ball" points out the need to consider the preamble in defining Appellants' invention.

3. BECAUSE THE EXAMINER HAS FAILED TO CORRECTLY CONSTRUE THE PENDING CLAIMS THE EXAMINER'S ASSERTION OF OBVIOUSNESS IS INCORRECT AND LEGALLY UNSUPPORTABLE.

As discussed above an applicant's claims must be correctly construed before they can be compared to the prior art to determine obviousness. Since Appellants' pending claims have not been correctly construed, the assertion that Appellants' pending claims are obvious over the cited references is incorrect and legally

unsupportable. Appellants' pending claims are not obvious over the cited references for at least this reason.

B. THE EXAMINER HAS THE BURDEN OF ESTABLISHING A *PRIMA FACIE* CASE OF OBVIOUSNESS WITHIN THE LEGAL REQUIREMENTS CREATED BY THE COURTS.

The courts have further established the legal concept of *prima facie* obviousness. As summarized in MPEP §2142, "The legal concept of *prima facie* obviousness is a procedural tool of examination which . . . allocates who has the burden of going forward with production of evidence in each step of the examination process." The MPEP further states "The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness."

To establish a *prima facie* case of obviousness three basic criteria must be met.

First there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See M.P.E.P. §2143.

It is indisputable that in order to properly reach a conclusion as to obviousness pertinent case law requires that "there must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination."

Interconnect Planning Corp., v. Fell, 227 USPQ 543, 551 (Fed. Cir. 1985). Furthermore, it is considered "insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations . . ." Northern Telecom, Inc. v. Datapoint Corp., 15 USPQ2d 1321, 1323 (Fed. Cir. 1990); see also M.P.E.P. 2145(j)(3). In determining the differences between the prior art and the claims, the question under 35 U.S.C. §103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. Stratoflex, Inc. v. Aeroquip Corp., 218 USPQ 871 (Fed. Cir. 1983). Further, the prior art reference must be considered in its entirety, including portions that would lead away from the claimed invention. W.L. Gore & Associates, Inc. v. Garlock, Inc., 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984); see also M.P.E.P. §2141.02. The burden is on the Examiner to demonstrate that the prior art evidences sufficient suggestion of the desirability of doing what the inventor has done. See M.P.E.P. §2142. At an irreducible minimum, this burden requires this Examiner to apply the facts of the case to "present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). Clearly, the Examiner cannot discharge himself from this burden by simply declaring all of the elements of an invention, along with the manner of combining these elements, to be well known in the art. Ex parte Stern, 13 USPQ2d 1379, 1381 (Bd. Pat. App. & Inter. 1989). The mere fact that the references can possibly be combined, does not render the resulting combination obvious unless the

cited art also suggests the desirability of that combination. In re Mills, 16 USPQ2d 1430 (Fed. Cir. 1990).

C. THE EXAMINER HAS FAILED TO ESTABLISH A *PRIMA FACIE* CASE OF OBVIOUSNESS AGAINST APPELLANTS' PENDING CLAIMS.

1. THERE IS NO SUGGESTION OR MOTIVATION, EITHER IN THE REFERENCES THEMSELVES OR IN THE KNOWLEDGE GENERALLY AVAILABLE TO ONE OF ORDINARY SKILL IN THE ART, TO COMBINE THE WALTERS AND FRIESE REFERENCES IN THE MANNER SUGGESTED BY THE EXAMINER.

a. THE FRIESE REFERENCE DOES NOT TEACH OR SUGGEST PRODUCTION OF THE LEATHER PROPERTIES REQUIRED BY THE WALTERS REFERENCE.

The Walters reference in column 1 discloses that tanned leather is the preferred material for game balls such as a football. However, the Walters reference goes on to teach that leather used in game balls must have certain properties such that every leather is not suitable for use in a game ball. The Walter's reference in column 1, lines 17-20 states "Along with the pebbled finish, football leather should have a tacky finish that gives the ball a good feel for gripping while throwing or catching the football." The Walters reference in column 1, lines 33-44 reemphasizes the importance of this tacky feel, stating "The key to the leather is its tanned-in tack, which greatly aids in the performance and feel of the football. . . . The tanned-in tacky feel provides a maximum amount of gripping aid without causing the football to be too sticky, which could result in release problems when throwing the ball." The Walters' reference at column 1, lines 39-42 teaches that the tackiness of the leather is so important that only one leather material has been the material of choice for both professional and

amateur governing organizations. In that same text the Walters reference teaches that changing this leather material with its preferred properties could affect the outcome of a game. The Walters' reference at column 4, lines 36-39 explicitly states that leather having an "oily, slippery feeling" is "not acceptable" for use in a football cover.

The Examiner admits in the November 28, 2000 Office Action at page 3, lines 4-5, and again in the April 25, 2001 Office Action at page 2, lines 16-18, that the Friese reference does not disclose use of the leather therein for game balls in general or American footballs in particular.

There is no teaching or suggestion that leather tanned by the Friese process is, or can be, tacky. In fact, leather tanned using the process of the Friese reference is described therein as "soft . . . with a . . . lardy feel and are particularly suitable for the production of shoe upper leather . . ." or "Soft . . . having a pleasant feel . . ." See Friese, column 3, lines 45-47 and column 4, lines 37-38 respectively, underlining added.

Webster's New International Dictionary, second edition (1956 unabridged) defines lardy as "containing, or resembling, lard; of the character or consistency of lard." As is well known lard or other animal fat products are slippery. The United States Army has studied use of lard to provide a slippery (low friction) coating (see Appendix 1, Non-Lethal Applicants of Slippery Substances also available at WWW.dtic.mil/ndia/nld4/mathis.pdf). Additionally, upperclassmen at the United States Naval Academy have for years coated a campus monument with lard to hinder freshman from climbing that monument at the end of the school year. (see Appendix

1, Climbing that slippery pole, also available from WWW.guardian.co.uk/gallery/image/0,8543,-10404190606,00.html and From Lard to Blue Angels, a Week of Traditions, also available from WWW.bille.cudenver.edu/annapolis/traditions.html). Further, lard is the source of lard oil, which as explained in the above dictionary is used as a lubricant. Thus, a lardy feel would be synonymous with a slippery feel.

As previously noted, the MPEP states that there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine the reference teachings. The Walter's reference emphasizes the need for the leather of game ball covers to have a tacky feel. The Friese reference teaches that the tanning process therein provides leather that is soft with a lardy feel. Clearly, a lardy (smooth and slippery) feel is the opposite of a tacky feel. Thus, there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to use the "lardy" leather of Friese in the game ball cover of Walters. For at least this reason Appellants' claims 1-6, 8-12 and 17-18 are not *prima facie* obvious over the references of Friese and Walters and is therefore patentable.

b. THE EXAMINER HAS FAILED TO PROVIDE A "CONVINCING LINE OF REASONING" AS TO WHY IT WOULD BE OBVIOUS TO COMBINE THE FRIESE AND WALTERS REFERENCES.

The burden is on the Examiner to demonstrate that the prior art evidences sufficient suggestion of the desirability of doing what the inventor has done. See

M.P.E.P. §2142. At an irreducible minimum, this burden requires this Examiner to apply the facts of the case to "present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references."

The Examiner admits the Friese reference is deficient in teaching or suggesting that leather tanned as instructed therein can be used in game balls. The Examiner attempts to make up for these deficiencies asserting "Regarding the preamble recitation that the ball is a 'game ball' no patentable weight is given to the term 'game ball' because such is a functional term. The leather can be used on any product including a game ball." See November 28, 2000 Office Action, page 3, lines 13-15 and April 25, 2001 Office Action at page 3, lines 6-8. The Examiner's assertions are contradicted by the text of the Walters reference at column 1, lines 33-44, which as discussed above, teaches explicitly that every leather is NOT suitable for use as a game ball cover. Thus, the reasons asserted by Examiner Aryanpour for combining the Walters and Friese references are contrary to the teachings contained within these references and fail to "present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious". For at least this reason Appellants' claims 1-6, 8-12 and 17-18 are not *prima facie* obvious over the references of Friese and Walters and are therefore patentable.

Additionally, the April 25, 2001 Office Action at page 3, lines 3-8 states (underlining added): "It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the "fatliquored" method of Friese et al to

the football of Walters in order to provide a waterproofed leather football". Similarly page 6, lines 8-10 of the April 25, 2001 Office Action, discussing motivation for combining the cited references, states "[I]n this case, combining a method of producing a waterproof leather with a known game ball in order to increase resistance to moisture absorption."

However the Walters reference already teaches a waterproofed leather football. In fact, as shown in Table 2 below, the ST-5 game ball and the Walters' game ball in either the roller-coat panel/spray outside of game ball version or the panel submersion/spray outside of game ball version all have superior moisture resistance to Examiner Aryanpour's hypothetical game ball made using leather tanned as disclosed in the Friese reference. Thus, the reasons asserted by Examiner Aryanpour for combining the Walters and Friese references are contrary to the teachings contained within these references and fail to "present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious". For at least this reason Appellants' claims 1-6, 8-12 and 17-18 are not *prima facie* obvious over the references of Friese and Walters and are therefore patentable.

Further, the Examiner previously admitted that the Walters reference teaches away from a water spray test as unreliable and erratic (see July 3, 2000 Office Action, page 4, point 6, fourth paragraph). The Friese reference appears to teach immersion of the sample in water and does not teach or suggest a spray type test. See Friese, column 4, lines 42-45; column 5, line 30; and column 6, line 12. Clearly the cited references, singly or in combination, do not teach or suggest Appellants' rain test or

rain test results. The Examiner attempts to make up for these deficiencies by asserting "Regarding the recitation 'wherein when said ball is subjected to three 90 minute cycles of a rain test, . . . such ratio being a maximum of 1.25:1.', such is not given patentable weight because such is a 'method of testing' the 'end product' under various test conditions in order to determine its durability, i.e. 90 minutes cycles of a rain test, and it is considered to be functional language." As discussed above, the Examiner's decision to ignore the functional limitations of Appellants' claims is contrary to instruction from the MPEP and legal precedent. Thus, the reasons asserted by Examiner Aryanpour for combining the Walters and Friese references fail to "present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious". For at least this reason Appellants' claims 1-6, 8-12 and 17-18 are not *prima facie* obvious over the references of Friese and Walters and are therefore patentable.

2. THE WALTERS AND FRIESE REFERENCES, SINGLY OR IN COMBINATION, DO NOT PROVIDE THE LEGALLY REQUIRED REASONABLE EXPECTATION OF SUCCESS REQUIRED TO ESTABLISH A *PRIMA FACIE* OBVIOUSNESS REJECTION.

Obviousness does not require absolute predictability, however at least some degree of predictability is required. Evidence showing there was no reasonable expectation of success may support a conclusion of nonobviousness. See MPEP §2143.02 citing In re Rinehart, 189 USPQ 143 (CCPA 1976). In discussing predictability, the courts have recognized the unpredictability of the chemical arts. "[i]n the field of chemistry generally, there may be times when the well-known unpredictability of chemical reactions will alone be enough to create reasonable doubt

as to the accuracy of a particularly broad statement put forward as enabling support for a claim. In re Marzocchi, 169 USPQ 367, 368-370 (CCPA 1971).

As discussed above, the Walter's reference teaches the need for the leather of game ball covers to have a tacky feel. The Walters' reference explicitly warns that slippery leather is "not acceptable" for use in a football cover. Also as discussed above the Friese reference teaches that the tanning process therein provides leather that is soft with a lardy feel. There is no teaching or suggestion that leather tanned by the Friese process is, or can be, tacky. Given the teachings of the Walters and Friese references and the known unpredictability in the chemical arts generally and the Friese reference specifically, a person of ordinary skill in the art would have no reasonable expectation of success in obtaining the tacky leather taught necessary in Walters using the tanning process disclosed in the Friese reference. For at least this reason Appellants' claims 1-6, 8-12 and 17-18 are not *prima facie* obvious over the references of Friese and Walters and are therefore patentable.

3. EVEN IF THE WALTERS AND FRIESE REFERENCES ARE IMPROPERLY COMBINED, THE COMBINED REFERENCES DO NOT TEACH OR SUGGEST ALL OF THE FEATURES OF THE PENDING CLAIMS.

Arguendo, even if the Walters and Friese references are improperly combined, Appellants assert that such combination highlights the superiority of Appellants' invention over the existing art. The Walters reference in the table at column 8, lines 21-30, shows that the known Rawlings brand ST-5 football has superior moisture resistance properties to any of the water repellant-coated footballs of the Walters' invention.

Appellants have also used a Rawlings ST-5 football as a comparative example to the game balls of Appellants invention. As discussed in the Response dated September 14, 2000, Appellants' inventive game ball is superior to the Rawlings ST-5 football within the claimed ranges.

As discussed in Appellants' specification a football weighs about 400 grams (396 gms for example 1, see note 2 on page 15; 402 gms for comparative example 1, see note 2 on page 17; 419 gms for comparative example 2, see note 2 on page 19; 404 gms for comparative example 3, see note 2 on page 21; 404 gms for comparative example 4, see note 2 on page 23 and 390 gms for comparative example 5, see note 2 on page 25). The Friese reference discusses the water absorbed by leather tanned using the process therein. While not stated in that reference, Appellants assume the leather was immersed or soaked to arrive at these figures. Appellants acknowledge that Examples 1C and 2 recite water absorption figures for a 6 hour test, however there is no teaching or suggestion that the amount of water absorbed after 1 hour was significantly less. Assuming the Examiner's hypothetical 400 gm football was constructed using leather tanned by the process of Friese, and using the water uptake figures recited in Friese, the football would absorb the following amounts of water.

Table 1		
Friese example	water uptake recited	water amount absorbed
Example 1A, col. 4, line 44	70%	400 x .70 = 280 gms
Example 1B, col. 4, line 44	34%	400 x .34 = 136 gms
Example 1C, col. 4, line 45	<20 %	400 x .20 < 80 gms
Example 2, col. 5, line 30	<20 %	400 x .20 < 80 gms
Example 3, col. 6, line 12	35 %	400 x .35 = 140 gms

Thus, the hypothetical football proposed by the Examiner absorbs between about 80 gms and 280 gms of water. The results of Table 1 are compared with the water absorption results taught in the Walters reference in Table 2 below.

Table 2			
Sample	Citation	submersion test result	rain test result
		(gms)	(gms)
Hypothetical game ball using Friese treated leather	Table 1 of this Response	80 - 280	----
ST-5 game ball	Walters, C8, L23	43.9	----
Walters' game ball, roller-coat panel/ spray outside of game ball (I)	Walters, C8, L24	48.2	----
Walters' game ball, panel submersion/spray outside of game ball (II)	Walters, C8, L26	53.9	----
Walters' game ball, panel Submersion/no outside spray (III)	Walters, C8, L28	140.5	----
Untreated tanned leather football	Walters, C8, L22	145.8	----

As can be seen from Table 2, the ST-5 game ball absorbs the least moisture; the game balls of Walters absorb more moisture than the ST-5 game ball; and the Examiner's proposed game ball absorbs more moisture than the ST-5 game ball or the Walters' game ball. Thus, the game balls discussed in Table 2 can be ranked as follows:

less moisture absorbed	ST-5 game ball
	Walters' game ball versions I or II
more moisture absorbed	Examiner Aryanpour's proposed game ball

Results for Appellants' inventive moisture resistant game ball are shown in Table 3 below. Appellants' cycle number and times correspond to the range recited in claims 1, 2, 5, 6 and 12.

Table 3

Sample	Citation	submersion test result	rain test result
		(gms)	(gms)
Appellants' game ball with lining three, 90 minute cycles	App. Table 1(A)	----	51.8
Appellants' game ball without lining three, 90 minute cycles	App. Table 2(A)	----	103.5
ST-5 game ball, sample A three, 90 minute cycles	App. Table 3(A)	----	127.7
ST-5 game ball, sample B three, 90 minute cycles	App. Table 4(A)	----	142.3

As can be seen from Table 3, Appellants' game balls in either version absorb less moisture than the ST-5 game ball. Thus, the game balls discussed in Table 3 can be ranked as follows:

less moisture absorbed	Appellants' game ball
more moisture absorbed	ST-5 game ball

The difference in test methods makes comparison of the quantitative water absorption between the test results of Friese, Walters and Appellants impossible. However, the fact that Appellants' inventive game balls have lower moisture absorption than the ST-5 game balls in the rain test, and the fact that the ST-5 game ball has lower moisture absorption than either the Walters' game balls or the Examiner's hypothetical game balls in the submersion test, makes it clear that qualitatively, Appellants' game balls absorb less water than any of 1) the ST-5 game balls, 2) the Walters' game balls or 3) the Examiner's hypothetical game balls. Restated, the game balls of Tables 2 and 3 can be qualitatively ranked as follows:

less moisture absorbed	Appellants game balls
	ST-5 game ball
	Walters' game ball, versions I or II
more moisture absorbed	Examiner Aryanpour's proposed game ball

Given the admission that the Walters' game balls exhibit erratic and unreliable results under spray testing, one can only conclude that if the Walters' game balls had been tested under Appellants' rain test, they would have performed worse than shown above.

As can be seen from the above discussion, Appellants' inventive game ball has moisture resistance superior to that of any of the Rawlings ST-5 game balls (as established by testing) or the Walters' game balls (as established by qualitative

comparison of published results) or the Examiner's hypothetical game balls (as established by qualitative comparison of an extrapolation of published results). Since the cited references of Walters and Carlson, either singly or in combination, do not teach or suggest all of the features of Appellants' claims 1-6, 8-12 and 17–18, those claims are patentable for at least these additional reasons.

D. WHEN CONSIDERED AS A WHOLE THE WALTERS REFERENCE AND THE FRIESE REFERENCE TEACH AWAY FROM EACH OTHER.

As previously noted, prior art references must be considered in their entirety, including portions that would lead away from the claimed invention. As discussed above, the Walter's reference teaches the need for the leather of game ball covers to have a tacky feel. The Walters' reference also explicitly teaches that slippery feeling leather is "not acceptable" for use in the game ball therein. Also as discussed above the Friese reference teaches that the tanning process therein provides leather that is soft with a lardy feel. There is no teaching or suggestion that leather tanned by the Friese process is, or can be, tacky. Thus the references of both Friese and Walters teach against combination with each other. For at least this reason Appellants' claims 1-6, 8-12 and 17-18 are not *prima facie* obvious over the references of Friese and Walters and are therefore patentable.

E. THE WALTERS AND FRIESE REFERENCES, SINGLY OR IN COMBINATION, DO NOT TEACH OR SUGGEST ALL OF THE FEATURES OF PENDING CLAIM 5.

Claim 5 recites in pertinent part: "wherein the lining is coated with at least one water resistant polymeric material selected from the group consisting of epoxy, polyester and urethane materials." The Office Action mailed on April 25, 2001 states on page 3: "[r]egarding claims 5 and 6, Waiters shows a vinyl-impregnated polyester fabric containing two or three plies. Although applicant has removed the 'vinyl' limitation from the claim, still a 'polyester' fabric is vinyl-impregnated, and it is well known to use a lining made from the groups consisting of epoxy, polyester and urethane materials."

MPEP §2142, citing relevant legal precedent, states that the burden is on the Examiner to demonstrate that the prior art evidences sufficient suggestion of the desirability of doing what the inventor has done. Further, the courts have also stated the Examiner cannot discharge himself from the above burden by simply declaring all of the elements of an invention, along with the manner of combining these elements, to be well known in the art. Ex parte Stern, 13 USPQ 2nd 1379, 1381 (Bd. Pat. App. & Inter. 1989). The Examiner has not provided any support for the stated assertions that "still a 'polyester' fabric is vinyl-impregnated" or "it is well known to use a lining made from the groups consisting of epoxy, polyester and urethane materials." Clearly, the Examiner's unsupported and cursory statements are contrary to the instructions of MPEP §2142 and relevant legal precedent and

are insufficient to support a *prima facie* obviousness rejection. Claim 5 is patentable for at least this additional reason.

F. THE WALTERS AND FRIESE REFERENCES, SINGLY OR IN COMBINATION, DO NOT TEACH OR SUGGEST ALL OF THE FEATURES OF PENDING CLAIM 6.

Claim 6 recites in pertinent part: "wherein the lining comprises a fiber reinforced sheet-like material with water resistant properties." The Office Action mailed on April 25, 2001 states on page 3: "[r]egarding claims 5 and 6, (Waiters) Walters shows a vinyl-impregnated polyester fabric containing two or three plies. Although applicant has removed the 'vinyl' limitation from the claim, still a 'polyester' fabric is vinyl-impregnated, and it is well known to use a lining made from the groups consisting of epoxy, polyester and urethane materials."

MPEP §2142, citing relevant legal precedent, instructs that the burden is on the Examiner to demonstrate that the prior art evidences sufficient suggestion of the desirability of doing what the inventor has done. Further, the courts have also stated the Examiner cannot discharge himself from the above burden by simply declaring all of the elements of an invention, along with the manner of combining these elements, to be well known in the art. Ex parte Stern, 13 USPQ 2nd 1379, 1381 (Bd. Pat. App. & Inter. 1989). As discussed above the Examiner has not provided any support for the stated assertions that "still a 'polyester' fabric is vinyl-impregnated" or "it is well known to use a lining made from the groups consisting of epoxy, polyester and urethane materials." Further, the Examiner has failed to

indicate where in the cited references a "fiber reinforced sheet-like material with water resistant properties" is taught or suggested. Clearly, the Examiner's unsupported and cursory statements are contrary to the instructions of MPEP §2142 and relevant legal precedent and are insufficient to support a *prima facie* obviousness rejection. Claim 6 is patentable for at least this additional reason.

G. THE EXAMINER HAS RESORTED TO IMPERMISSIBLE HINDSIGHT TO ASSERT THAT APPELLANTS' CLAIMS ARE OBVIOUS OVER THE WALTERS AND FRIESE REFERENCES.

35 U.S.C. §103 specifies that the obviousness of an invention is to be determined as of "the time the invention was made." This requires the Examiner to step backward in time and into the shoes worn by the hypothetical person of ordinary skill in the art when the invention was unknown and just before it was made. See MPEP §2142. "When applying 35 U.S.C. 103, . . . the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention . . ." Hodosh v. Block Drug Co., Inc., 229 USPQ 182, 187, n5 (Fed. Cir. 1986).

The Friese reference is silent concerning the use of the process disclosed therein to manufacture a tanned leather material having a tacky feel or use of leather tanned as taught therein for game ball covers. In fact, as previously discussed, the teachings of the Walters and Friese references would lead a person of ordinary skill in the art away from asserting that any leather can be tanned using any process and be suitable for use as a game ball cover. The Examiner has not provided any teaching or suggestion within the Friese reference that could teach or suggest the tanning of

leather having a tacky feel. In fact, the only route to discover the missing properties from the silent teachings of Friese is by impermissibly using Appellants' invention as a blueprint. Since the Examiner has impermissibly resorted to hindsight to assert a *prima facie* case of obviousness, the rejections of claims 16-25 should be reversed.

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H. SINCE APPELLANTS' CLAIMS ARE NOT OBVIOUS IN VIEW OF THE CITED ART, THE EXAMINER'S REJECTION OF CLAIMS 1-6, 8-12 AND 17-18 MUST BE REVERSED.

In the present rejections, the Examiner fails to properly construe Appellants' pending claims. The Examiner also interprets the disclosures of the cited references in a manner contrary to the disclosure within the references, and within the art generally, to find features that do not, and cannot, exist. The Examiner then combines these features, with no convincing showing of any suggestion or motivation for this combination. Even with improperly combined references, the Examiner's combination fails to teach or suggest all of the limitations of Appellants' claims. Since the Examiner has failed to meet the legal burden necessary to support a *prima facie* case of obviousness, the rejections of claims 16-25 should be reversed.

Respectfully submitted,

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Atty. Docket No.: SPALD/216/US

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IX. APPENDIX OF CLAIMS INVOLVED IN THE APPEAL

1. A game ball having increased resistance to moisture absorption comprising a natural leather cover disposed over a lining, the leather of said cover having increased water resistance properties distributed throughout during a tanning process, wherein when said ball is subjected to three 90 minute cycles of a rain test, said ball contains a maximum amount of water at the conclusion of said third rain test cycle as expressed as a ratio of the weight of the ball with absorbed water to the weight of the dry ball, such ratio being a maximum of 1.25:1.

2. The game ball as claimed in claim 1, wherein said ratio is a maximum of 1.15:1.

3. A game ball having increased resistance to moisture absorption comprising a natural leather cover disposed over a lining, the leather of said cover having increased water resistance properties distributed throughout during a tanning process, wherein when said ball is subjected to six 45 minute cycles of a rain test and said ball is permitted to dry at approximately 70°F for 24 hours between cycles, said ball contains an amount of water at the conclusion of each said rain test cycle as expressed as a ratio of the weight of the ball with absorbed water to the weight of the dry ball, an average per cycle ratio at the conclusion of said six rain test cycles being a maximum of 1.19:1.

4. The game ball as claimed in claim 3, wherein the ratio is a maximum of 1.10:1.

5. The ball as claimed in claim 1, wherein the lining is coated with at least one water resistant polymeric material selected from the group consisting of epoxy, polyester and urethane materials.

6. The ball as claimed in claim 5, wherein the lining comprises a fiber reinforced sheet-like material with water resistant properties.

8. A game ball with increased resistance to moisture absorption, said game ball comprising an inflatable bladder, a natural leather cover disposed over and surrounding said bladder, the leather of said cover having increased water resistance properties distributed throughout during a tanning process, and a lining disposed between said bladder and said cover, wherein when said ball is subjected to six 45 minute cycles of a rain test said ball will absorb an average per cycle water gain of a maximum of 90 g of water at the conclusion of said sixth rain test cycle.

9. A game ball as claimed in claim 8, wherein said ball will absorb an average per cycle water gain of a maximum of 65 g of water at the conclusion of said sixth rain test cycle.

10. A game ball as claimed in claim 8, wherein said ball will absorb a maximum per cycle water gain of 115 g of water at the conclusion of said sixth rain test cycle.

11. A game ball having improved resistance to water absorption comprising a cover of natural leather having a treatment to impart improved water resistant properties throughout the entirety of the leather, said treatment comprising tanning of said leather with chemicals prior to application of said cover to said game ball.

12. The game ball of claim 11 wherein when said ball is subjected to three 90 minute cycles of a rain test, said ball absorbs maximum amount of water at the conclusion of said third rain test cycle as expressed as a ratio of the weight of the ball with absorbed water to the weight of the dry ball, such ratio being a maximum of 1.25:1.

17. The game ball of claim 11 wherein when said ball is subjected to four 45 minute cycles of a rain test, said ball absorbs maximum amount of water at the conclusion of each said rain test cycle as expressed as a ratio of the weight of the ball with absorbed water to the weight of the dry ball, said ratio at the conclusion of said first rain test cycle being a maximum of 1.27:1 and said ratio at the conclusion of each of said second, third and fourth rain test cycles being no greater than said ratio at the conclusion of said first rain test cycle.

18. The game ball of claim 11 wherein when said ball is subjected to four 45 minute cycles of a rain test, said ball absorbs maximum of 110 g of water at the conclusion of any said rain test cycle and said ball absorbs an average per cycle water gain of a maximum of 90 g of water at the conclusion of the fourth cycle of said rain test.

Non-Lethal Applicants of Slippery Substances

By
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U.S. Forces are being tasked to conduct peacekeeping operations that may involve potential combatants, riotous crowds, or demonstrators protesting an event or situation. These operations may occur in an urban or rural area, municipality, or a third world country. Regardless of the location, terrain or environment, the soldier must be prepared and equipped to respond as necessary, to the level of intensity. A segment of that operation requires Marine Air-Ground Task Force and subordinate units to conduct various missions in Military Operations Other Than War (MOOTW). The Mission Need Statement (MNS) for an operational capability of U.S. Forces requires the tactical flexibility of employing a non-lethal weapon capability to conduct these operations. Furthermore, the MNS has identified a slippery or anti-traction material as a mobility denial system for personnel, vehicles, or aircraft. The requirements for a mobility denial system relate to all Department of Defense (DOD) components, and may have applicability to other Federal Government and local law enforcement agencies.

Background

The use of very low friction surface coatings has been suggested as useful as a method for disabling vehicles or controlling crowd movement. Despite popular perception, this concept is not new to military operational consideration - a significant history of experimentation dating back to the Korean War has been compiled previously (S. Scott, T. Goolsby, K. Collins and G. Goldsmith. "Dispensed Materials for Non-Lethal Operations". Third NDIA Conference on Non-Lethal Warfare, 1998).

The most recent experience with the military use of this concept began as a U.S. Army effort at Edgewood Chemical Biological Command (ECBC) in 1996. This project intentionally limited material screening to binary, water-activated polymers as low friction coatings. The chemical composition of materials considered at that time was further limited to polyacrylimide and polyacrylic acid-based substances, due to the very low risk of health or environmental hazard. Over two dozen commercially available polymer materials were qualitatively compared during this project, resulting in the selection of water mixtures with either Agefloc WT 603 (CPS Chemical) or various Percol powders (Allied Colliods) for further consideration. Subsequent field demonstrations performed in 1997 with these materials were successful in restricting vehicle and personnel mobility.

Despite the successful demonstration of the technology, problems remained with the logistic implications of the application. By 1998, advice from USMC personnel suggested that material improvements with the required quantities and dissemination methods were necessary.

Furthermore, the binary nature of the proposed coating implied that the water component was to be foraged from indigenous sources - a conditional dependence that may not always be met under all operational scenarios. An expansion of the classes of materials to be considered was therefore necessary, initiating the inclusion of Southwest Research Institute (SwRI) to this project in early 1999. At this point, the USMC MARCORSYSCOM formally adapted the program management of this development effort, acting as the lead agency for the JNLWD.

Currently, SwRI is under contract with the DOD to provide the support services in regards to the technical assessment of the capabilities and technologies currently available for an anti-traction material to meet the military's requirements. The work being performed consists of a sequence of tasks to systematically identify the military's requirements, review past efforts, perform a market survey of candidate materials, and perform a limited laboratory assessment of potential anti-traction materials to assess their operational characteristics. The contents of this presentation will summarize the activities to date and present the proposed approach for assessing candidate anti-traction materials.

Military Applications and Material Requirements

The application requirements define those scenarios of where, when, and how an anti-traction material would be employed. The material requirements represent the military's envisioned physical characteristics, properties, and performance criteria inherent for an anti-traction material. Identifying both the application and material requirements then provides the criterion for assessing candidate anti-traction material. Southwest Research Institute technical personnel met with military and civilian representatives cognizant of DOD's past and current anti-traction material programs and knowledgeable of the objectives when implementing an anti-traction material. The results of the meeting identified those requirements and application scenarios that could be used to select and evaluate candidate anti-traction materials.

To categorize the applicability of candidate materials, a classification criterion of *mandatory*, *preferred*, and *preferred plus* were established and applied to each of the military's requirements. That is, a defined minimum level of acceptability, an expected capability and an idealized performance level for an anti-traction material became necessary to differentiate candidate materials. In most cases, a material will be bound on the low end by the mandatory criteria, and a rough estimate of performance will be made on the high end. The preferred criteria will be expressed as a *performance objective* that describes the tactical environment and rationale for the performance measurement.

Tables 1 and 2 summarize the applications and material requirements generated by DOD personnel and the anti-traction material's classification for the various elements. The considerations presented in Tables 1 and 2 represent guidelines for defining the physical requirements and selection of anti-traction materials. The different elements associated with application requirements such as target, surface, dispensing method, etc., are considered to be broad based and encompassing. Foot traffic for example, would include pedestrians having no footwear, wearing civilian shoes, or personnel wearing military boots.

Table 1. Application Requirements

Material Classification	Target Sets / Surface Type		Dispensing System	Environment	Area Coverage
Mandatory	Foot Traffic	Level Surface Sloping Surface Concrete Walkways & Roads Asphalt Compact Soil	Manual (man portable)	40° to 100°F	800 sq. ft.
Preferred	Wheel Vehicles	Vegetated and Loose Soil Non-Porous	Mechanical (vehicle mount)	32° to 120°F	1,200 sq. ft.
Preferred Plus	Track Vehicles Aircraft	Concrete, Asphalt Compact Soil	Aircraft	<32° to 120°F	1,500 sq. ft.

Table 2. Material Requirements

Material Classification	Form	Activation	Deactivation	Application Time	Availability	Durability
Mandatory	As Available	As Required	Removable	1-hour	COTS	2 hours
Preferred	Single Component	Ready-to-Use	Biodegradable	10 – 30 minutes	COTS / MOTS	24 hours
Preferred Plus	Multiple Component or Single Sheet	Water Humidity Chemically	Reversible	5–minutes or less	Formulation	Several days

Identification of Anti-Traction Technologies

Southwest Research Institute was tasked to identify and investigate all appropriate anti-traction technologies and to determine the specific qualitative and quantitative measurements for each material or solution identified to meet the applications and requirements of Tables 1 and 2. The starting point for identification of anti-traction materials was DOD's and SwRI's *a priori* knowledge and experience in this area with materials typically used to reduce friction.

To minimize the selection of anti-traction materials to a workable choice of candidates, SwRI integrated the military's objectives with the technical requirements for anti-traction materials. The combination of these two elements defines the physical properties and characteristics for a material to be considered as a candidate anti-traction material with the military's requirement to accomplish a specific objective.

Anti-traction materials are dependent upon meeting both the military's applications and material requirements plus certain physical parameters that will enable the material to function as an anti-traction media. SwRI combined the required material parameters with the military's

requirements to produce a list of parameters for evaluating candidate material. These parameters, as indicated in Table 3, when combined with the military's requirements presented in Tables 1 and 2, produced a list of 16 criteria for assessing candidate anti-traction material. The material assessment parameters represent a combination of material requirements, application considerations, environmental concerns, physical characteristics, and cost considerations.

Table 3. Material Assessment Parameters

Material Properties	Performance Characteristics	Economic Factors
Ecology	Activation	Availability
Temperature Range	Coverage	Cost
Toxicity	Deactivation	Composition
Viscosity	Dispensability	Storage
	Durability	
	Effectiveness	
	Surface	
	Target	

The criteria for the material assessment parameters, as defined for this study, are:

1. **Ecology:** The effect or lack of effect the material produces when exposed to the surrounding environment. An optimum material would be biodegradable, leaving no permanent or residual effects on any areas of contact.

2. **Temperature Range:** Refers to the temperature range associated with the climatic and surface conditions where the anti-traction material may be applied and remain capable of meeting performance requirements.

3. **Toxicity:** The relative personal protection required when handling and dispensing of the candidate material. Ideally, dispensing of the material would require minimum protective clothing or training with its use. An acceptable material, if ingested or within contact of the eyes, would not produce a life threatening or permanent injury.

4. **Viscosity:** The property of a fluid that defines its internal resistance to flow. The metric unit of measure for viscosity is poise, named in honor of Poiseuille. Water at 68°F has a viscosity of 0.01 poise, or one centipoise (cps). Bee's honey has a viscosity of 1500 cps, while 10-weight automotive motor oil has a viscosity of 70 cps.

5. **Activation:** The requirements imposed on an individual prior to dispensing the material.

6. **Coverage:** The effective area that can be covered with an anti-traction material by an individual using a man-portable dispensing system.

7. **Deactivation:** Time period required to intentionally remove or render the material ineffective as an anti-traction material.

8. **Dispensability:** The physical and mechanical hardware requirements to prepare and apply the material to a surface.

9. **Durability:** An anti-traction material is expected to remain in place for a finite time period. The material should have a cohesive ability to adhere to surface, be resistant to easy removal and require unique or specialized equipment for removal.

10. **Effectiveness:** A measure of the materials ability to be fully functional and capable of meeting performance requirements within a specified time period.

11. **Surface:** The intended composition, structure, surface condition, and topography where the anti-traction material would be applied.

12. **Target:** The specific person, place, or thing designated to become immobile as a result of interaction with the anti-traction material.

13. **Availability:** The commercial availability and accessibility of the base materials required producing the end item.

14. **Cost:** The estimated cost associated with the end product.

15. **Composition:** The physical make-up of the material or materials required for producing an anti-traction material.

16. **Storage:** The ability of the material to withstand periods of exposure to temperature and humidity extremes as commonly experienced in a storage location, without detriment to its effectiveness.

The sources for the candidate materials include materials identified after review of technical literature, professional publications, commercial product reports, prior government studies on anti-traction materials, review of patents delineating reduced traction or friction reducing materials, in-house experience with lubricants, friction reducers, material compositions, and, *a priori* knowledge and experience. Tables 4 and 5 identify categories that meet the proposed criteria for the material assessment parameters.

Tables 4 and 5 list the common chemical name or formulation and typical usage or application for the materials provided. Also indicated are those materials commonly thought of as being slippery or conducive to generating an anti-traction surface, e.g., artificial snow, oils, and greases. While these materials serve their intended purpose in specific applications when subjected to the assessment criteria in Table 3, they may have limited advantages and applicability. The tables are not intended nor designed to indicate a preferred selection or ranking of the individual materials but rather indicate the potential capability to meet the military's requirements.

Table 4. Non-Aqueous Anti-Traction Materials

Classification	*Representative Products*
Fats and Fatty Acids	
Animal	Lard
Vegetable	Tall Oil/Lecithin
Greases	
Animal	Lard
Fuels	Jet/Diesel
Metal Soaps	Magnesium Stearate
Mineral	Auto Crankcase
Polyaliphatics	Hexadecyl-myristate
Polyalphaolefins	Synthetic motor Oil
Polyaromatics	Tetralin
Polyglycols	Carbowax 2000
Polysilicones	DC 2000
Polysiloxanes	GE SR32
Oils	
Mineral	Motor oil
Vegetable	Corn oil, etc.
Surfactants	
Anionnic	Sodium oleate
Fatty Alcohols	Tetradecanol
Glycolesters	Butyl Carbipol
Glycolethers	Dimethylcellusolve
Glycols	Glycerin
Nonionic	Triton X100

Table 5. Aqueous Anti-Traction Materials

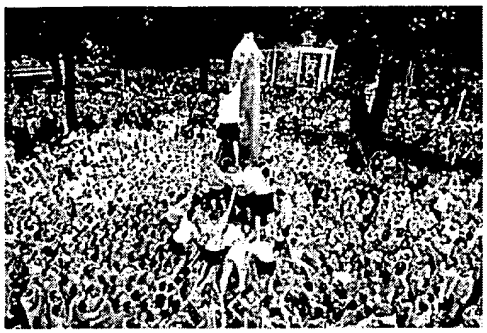
Classification	*Representative Products*
Polysacchrides	
Cellulosics	Alginates
Guar Gums	Jaguar
Starches	Corn, Rice
Sugars	Corn Syrup
Polyols	
Cellulose Esters	Carboxymethyl – Cellulose
Cellulose Ethers	Methylcellulose
Glycols	Glycerin, Propyleneglycol
Polyacrylamides	Agrofloc
Polyacrylates	Cydril
Polyethylene – Oxides	Polyox
Polyglycols	Carbowax 2000
Vinyl Alcohols	Elvanols
Surfactants	
Soaps, Detergents	Dishwashing and Laundry Detergents

The candidate materials listed in Tables 4 and 5, while capable of producing a reduction in the coefficient of friction thereby producing a "slippery surface" are, in their current composition, not considered acceptable for meeting the military's requirements. During prior studies by SwRI, it became apparent that a low coefficient of friction (COF) is only partially essential to assure denial. Rheology, mass, and film thickness are also critical values for resistance to displacement by foot or vehicle traffic. A thin film of slippery material of any viscosity (low or high) is only effective against rapid motion or high speeds where hydroplaning or low displacement of lubricant films occurs. To effectively address all speeds, masses, and profiles interfacing with the lubricant and the substrate, the film thickness and resistance to displacement by foot or vehicle movement must be considered together with COF. Initial screening studies suggest a film thickness of approximately 100-150 mils (0.010 to 0.015 inches) with sufficient stiffness to resist vertical displacement, is necessary and applicable to all target areas. Such a film has little or no slump, is adherent to flat and sloping surfaces, and should prove to be equally effective against all types of terrain and surfaces identified in the military's requirements.

Laboratory testing of candidate materials will define the physical characteristics of selected materials and their ability to meet the military's requirements. During the laboratory evaluation effort, the feasibility of chemically enhancing and/or physically altering the composition of the material to meet specific objectives will be assessed. The candidate anti-traction materials will be initially assessed in a laboratory environment and then verified during a simulated field environment to replicate the military's scenarios for anti-traction material.

May 22 2001

Climbing that slippery pole
United States Naval Academy students struggle to replace the white "dixie cup" hat with an upperclassman's hat on the lard-covered Herndon monument at the naval academy in Annapolis. The event is part of ceremonies which culminate with the graduation of the senior class.
Photo: Roberto Borea, AP



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From Lard to Blue Angels, a Week of Traditions

COPA

It's May once more at the U.S. Naval Academy, a time when all thoughts turn to tradition. May signifies Commissioning Week- the most festive time of the year at the Academy, but also the time when all at the Academy reflect on the time-honored traditions of its 154-year- past.

Yearly events take place during this jam-packed week of pomp and pageantry-a week that midshipmen look forward to all year long. Such traditional happenings as the historic Ring Dance, the stirring Color and Dress parades, the enthusiastic Herndon Monument climb, the spirited painting of Tecumseh and the roar of the Blue Angels flying in perfect formation above-all culminate in the grandest of all traditions-graduation day.

On that day, four years of hard work, dedication and teamwork magically come together into one of the most famous sights in America-the tossing of about 1,000 caps into the air as midshipmen signal their jubilation over finally becoming officers in the U.S. Navy or Marine Corps.

The first event showcases the midshipmen who will be in line to graduate next May 2000. Hailed as the social event of all four years at the Academy, the Ring Dance takes placeduring the final week of a second (junior) class midshipman's career. A Naval Academy tradition since 1925, the Ring Dance has come to symbolize a rite of passage when all second class mids receive the unique rings which their own class has designed.

The rings symbolize the bond that exists between each midshipman, the class and the Naval service. The ring has served as a distinguishing mark of the Naval Academy graduate for over one hundred years, and it is recognized around the world as a symbol of pride, authority and excellence.

All class rings since 1906 bear the Academy's official seal, or coat-of-arms, on one side of the stone. Adopted in 1899, the seal consists of a hand grasping a trident, a shield bearing an ancient galley ship coming into action, an open book and a banner with the motto "Ex scientia tridens," meaning "from knowledge, sea power.

The ring designed to uniquely represent each class actually has a four-year story. As plebes, each class submits artistic renditions of possible class crests before a committee which ultimately asked each member of that class to vote on its number one choice. Beginning with the Ring Dance, these rising senior midshipmen traditionally wear their Naval Academy rings on the third finger of the left hand with the Naval Academy seal facing outward. Upon graduation, they reverse the ring so that the seal faces inward, closest to the graduates' hearts.

Before 1925, second class mids were entitled to wear their rings only after completion of the final examination in navigation. Tradition has it that as the jubilant midshipmen left Luce Hall, lurking first class (senior) mids threw them into Dewey Basin to baptize the rings and their owners. The Tradition of baptizing the rings returned in 1937, this time in the form of a binnacle filled with waters from the Seven Seas.

From that lime to the present, each second class midshipman has dipped the newly-acquired ring into waters from the Pacific, Atlantic. Indian, Arctic and Antarctic oceans, as well as from waters of the Mediterranean and Caribbean seas. From much closer to home, the binnacle also contains waters from the Severn River which flows along the banks of the academy itself.

According to legend, there is also water melted from Antarctic ice which fell as snow the year Christ was born. In more recent decades, the binnacle has also contained water flown into space by graduates of the Naval Academy.

This year's Ring Dance will be on Saturday, May 22.

Probably the oldest traditions of Commissioning Week at the Naval Academy are the dress parades, begun in 1846 only one year after the Academy was established. The first parade, held June, 1846, was in honor of the Board of Examiners. It consisted of exercises in the manual of arms and infantry tactics.

The first Dedication Parade was held at the Academy on May 31.1969. This dress parade honors those members of the Academy faculty who are retiring, completing 20 or more years of service or who have been selected as professors emeriti. Also honored at the parade are: faculty recipients of the William P. Clements Award for excellence in education; the Class of 1951 Civilian Teaching Excellence Award; the Class of 1951 Military Teaching Excellence Award; the Naval Academy Alumni Association Research and Service Excellence Awards; the Frank M. Adams Junior Officer Leadership Award; and the Agar Award for Excellence in Teaching.

This year's Dedication Parade will he held at 11 am. on Friday, May21, on Worden Field.

The Color Parade is the formal presentation of the colors (flags) to the company that, by virtue of its excellence in academics, athletics and professional accomplishments throughout an entire year of competition, has won the honor of being designated color company. This company will carry the colors for all events until Commissioning Week the next year. The color company competition began in 1867. The company commander selects a Color Company Honoree (formerly know as the Color Girl) to transfer the colors.

Each year a company within the Brigade of Midshipmen has two company commanders; one for fall semester and one for spring semester. Both midshipmen commanders will receive awards. The Forrestal Award is a silver tray donated by the late Charles P. McCormick and the Steward Wight Hannah Memorial Trophy is a silver bowl engraved with the number of the Color Company and displayed in Bancroft Hall during the following academic year.

A different type of pageantry-the firing of cannons-signals the charge of 1,000 eager, screaming plebes toward a 21-foot grey monument that has taunted them all year. The plebes (freshmen) attempt to climb the lard-covered obelisk as thousands of spectators watch with the hopes that they will complete the task quickly. This event at the Academy is known simply as "Herndon" or the "Plebe Recognition Ceremony."

The plebe class works together to accomplish the goal of retrieving a white plebe "dixie cup" hat from atop the monument and replacing it with an upperclassman's hat. It is a tradition that has endured at the Naval Academy for many years. More than 200 pounds of lard applied to the

monument by upper-class midshipmen complicate the task.

To understand the tradition and emotion of the climb, it is necessary to understand the qualities of the man for whom the monument is named.

Commander William Lewis Herndon, (1813-1857), possessed the qualities of discipline, teamwork and courage. In command of the ship Central America, home bound with California gold seekers, Herndon lost his life in a gallant effort to save his ship and men during a hurricane off Cape Hatteras. These are the attributes necessary to fulfill the Herndon tradition.

The Naval Academy tradition of climbing Herndon has never had a specific date documented to its origin. The monument climb evidently originated from an enthusiastic charge of former plebes. After the graduation ceremony, held on the Yard (campus) once upon a time, the upperclassmen shook hands with the newly appointed "youngsters" (sophomores). The new third class proceeded to reverse their caps and coats. Next, youngsters did a snake dance through the Yard, and romped through Lover's Lane, an area restricted to them while they were plebes. Throughout the celebration, they chanted, "Tain't no mo' plebes." All the youngsters eventually rallied around the monument due to its close proximity to Lover's Lane.

In 1973, then Academy superintendent Vice Adm. William P. Mack gave his shoulder boards to Midshipman Fourth Class Lawrence J. O'Donnell, who climbed to the top of Herndon in 1 minute 50 seconds, thus beginning the shoulder board tradition.

The Herndon ceremony will start off with a blast at precisely 2 p.m. on Friday, May 21 as plebes dash toward the monument. At first sight it looks much taller than it actually is, perhaps due to the hundreds of pounds of lard slathered on by upperclassmen. The fatty, white goo is removed by shoe-throwing, hands, shirts and bodies.

The smell of the melting lard permeates the nostrils of thousands of cheering spectators. Bodies turn red with beads of sweat dripping down the human tower. Agony shows on the faces of those at the bottom of the pyramid as they support three or four tiers of muscular bodies on their shoulders. As the crowd yells in anticipation. the class gets excited and "They're gonna make it!" is heard all around. Crash. The bodies suddenly collapse like dominoes. Their greasy skin, stained with dirt, lard and sun makes them too slippery to sustain a human pyramid for more than a few victorious seconds.

At the start, their expectations soar. No plebes doubt that their climb will be the best of any class to date. After all, it seems each plebe has devised a plan that would get someone to the top quickly. As they climb, many bodies are sacrificed. Some become human supports, allowing their torsos to be pulled like taffy while some act as ladders. Shoes are frantically kicked off for fear of stepping on one's shipmates. In the course of the long first hour, throngs of courageous midshipmen try in vain to reach the peak of Herndon.

They finally realize that this is not the easy task they envisioned in their dreams. They now comprehend, more than before, that to overcome their task it will take teamwork and determination. Within the next half-hour, a classmate may be near the top. One falls, but is quickly replaced by another. Their hopes are slowly fading away. They wonder if they will be the first class to fail to get to the top of the monument.

The graduating Class of 1998 holds the longest record with the time of four hours, five minutes and 17 seconds, beating the Class of 1988 which previously held the record with three hours, 12 minutes and 23 seconds. The fastest times are three minutes for the Class of 1965 (first recorded time) and one minute, 39 seconds (the fastest time officially recorded) for the Class of 1972. (Editor: Reported to be the only year that the monument was not coated with lard.)

Tradition states that the plebe who reaches the top will rise to the rank of admiral first. As any observer can recognize, climbing to the top of Herndon takes a great deal of teamwork and perseverance. Ascending Herndon serves as a review for young midshipmen, reminding them of the values of teamwork, courage and discipline that are instilled throughout the year.

In 1967, the graduation ceremonies moved to Navy-Marine Carps Stadium. This meant new third class mids (sophomores) could no longer run to Herndon after graduation.

The loudest and largest crowd gathering event takes place on Monday, May 24, at 2 p.m. when the Blue Angels zoom over Annapolis. The Blue Angels, known officially as the U.S. Navy Flight Demonstration Squadron, have performed their precision flying demonstrations for more than 291 million spectators. They have been performing during Commissioning Week for more than 50 years. Although the individual maneuvers performed by the team are those taught to every prospective Navy and Marine Corps aviator during flight training, the show has evolved throughout the years. The first team was organized in 1946 becoming the epitome of aerial artistry. There were four Grumman F6F Hellcats in the original demonstration when the tight diamond formation flown by the pilots became the trademark of the Blue Angels. The Blue Angels currently fly the strike/fighter plane McDonnell Douglas F/A- 18 Hornet. Spectators can view the demonstration from Dewey Field.

As visitors stroll through the Yard during Commissioning Week, they will see the statue Tecumseh proudly painted in the choker white uniform with ensign shoulder boards. The figurehead has for many years played a prominent part in the traditions of the Academy.

The original wooden image was sent to the Naval Academy in 1866 after being salvaged from the wreck of the old ship of the line Delaware, which had been sunk at Norfolk during the Civil War to prevent her from falling into Confederate hands. The builders of the Delaware intended the figure head to portray Tamanend, the great chief of the Delawares, a lover of peace and friend of William Penn. To the midshipmen of the period, there was nothing in the name of Tamanend to strike the imagination.

For 40 years, the wooden figurehead kept its stern vigil in the Yard until the winds, sun and rain began to take their toll. In 1906, a facelift with the aid of cement, putty and paint temporarily removed the signs of age. When the ravages of the weather again threatened, the Class of 1891 raised a fund to immortalize the old fellow in bronze. The delicate task was accomplished at the U.S. Naval Gun Factory.

To ensure that the bronze figure would lose none of the potent power with which the midshipmen had endowed the old figurehead, the wooden "brains" and "heart" of the old Indian were transferred to the bronze statue.

In the spring of 1930, the statue, mounted on a pedestal of Vermont marble adorned with the Academy seal, was erected on its present site from which the grim old warrior gazes eternally toward the main entrance of Bancroft Hall, the midshipman dormitory.

In addition to becoming a tourist attraction, Tecumseh has become not only the "God of 2.0" - the passing grade point average at the Academy-but also the idol to whom loyal midshipmen give prayers and sacrificial offerings of pennies. Midshipmen offer a left-handed salute in tribute to Tecumseh, and they toss pennies his way for good luck in exams and athletic contests.

Tecumseh is often decked out in a coat of "war paint," but nothing is more stunning than the white uniform he sports during this festive time.

The most picturesque event of Commissioning Week is perhaps the sea of white hats thrown up

in unison at the end of the graduation ceremony. Although the hat toss is now a traditional ending to graduation and commissioning ceremonies at all of the service academies, it originated at the Naval Academy in 1912. Before 1912, Naval Academy graduates were required to serve two years in the fleet as midshipmen before becoming commissioned officers in the Navy, thus they needed to keep their midshipmen covers. The Class of 1912, commissioned at graduation, was issued officer caps. In a spontaneous gesture, the new officers tossed their midshipmen hats into the air. This "hat toss" has since become the symbolic end to the four-year program at the Academy.

To access a more detailed schedule, access the Academy's website at <http://www.nadn.navy.mil>

Whether watching greasy bodies at Herndon, midshipmen in parade uniforms or Blue Angels in the sky, Commissioning Week at the United States Naval Academy promises to be fun and exciting for families and friends from coast to coast.

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